

Warmup (after learning piecewise)

Graph the following piecewise functions, then list their domain and range.

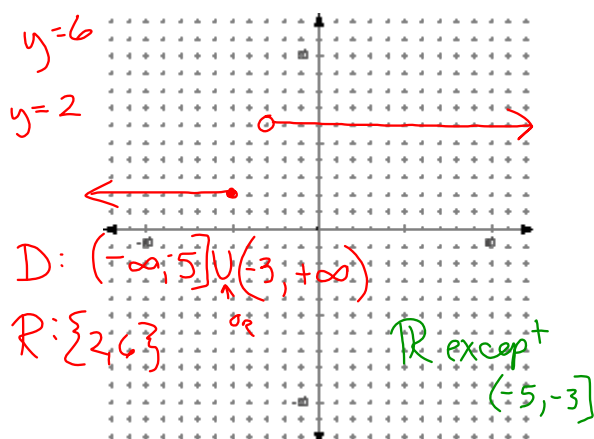
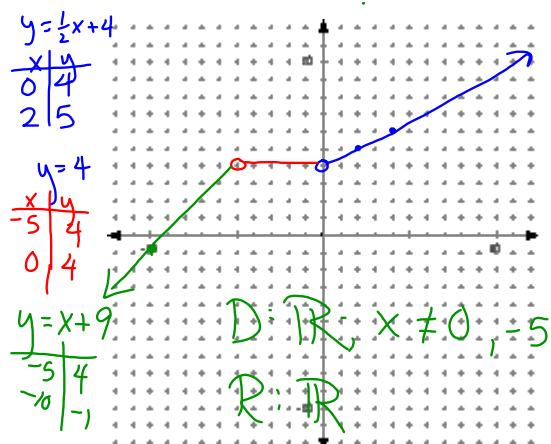
$$1. f(x) = \begin{cases} \frac{1}{2}x + 4 & x > 0 \\ 4 & -5 < x < 0 \\ x + 9 & x < -5 \end{cases}$$

Domain
Range

$$2. f(x) = \begin{cases} 6 & x > -3 \\ 2 & x \leq -5 \end{cases}$$

Domain
Range

Answer



2-6 Special Functions

Step function

$$f(x) = [x]$$

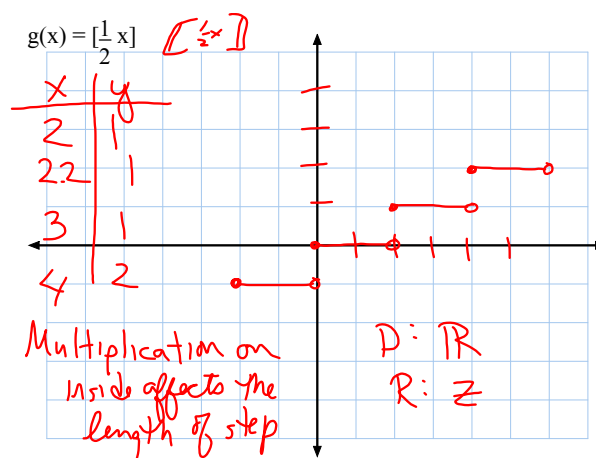
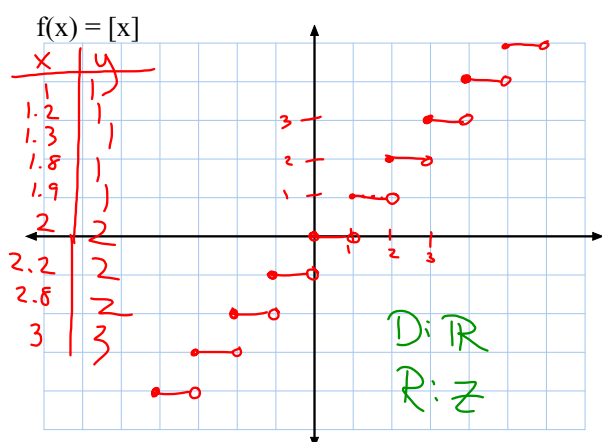
$$f(x) = \lfloor x \rfloor$$

The greatest integer function--the greatest integer less than or equal to x.

Examples:

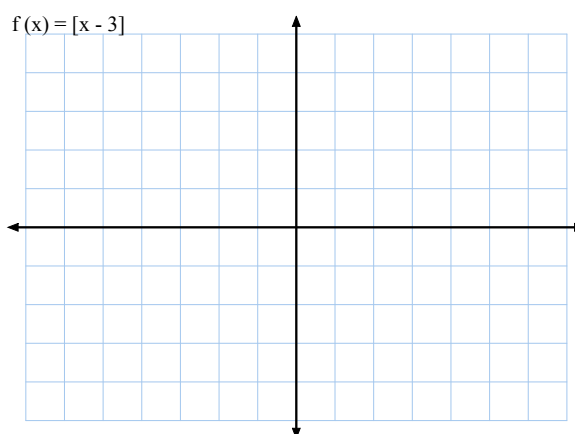
$$1. 3[4.2] - 5 = 7$$

$$2. 2[6.8] + 3 = 15$$



Mult. on outside affects
space b/w steps

Add/Subtr
changed the y-int



Piecewise Functions--a function that is written using two or more expressions

Def. Of absolute value:

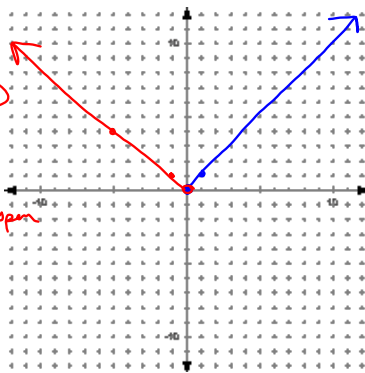
$$f(x) = \begin{cases} x & \text{if } x \geq 0 \\ -x & \text{if } x < 0 \end{cases}$$

① $y = x$
 $\begin{array}{c|c} x & y \\ \hline 0 & 0 \\ 1 & 1 \\ 5 & 5 \end{array}$

② $y = -x$
 $\begin{array}{c|c} x & y \\ \hline 0 & 0 \\ -1 & 1 \\ -5 & 5 \end{array}$ open

Domain: \mathbb{R}

Range: $[0, +\infty)$



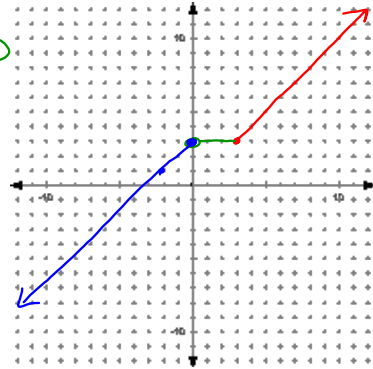
① x if $x \geq 3$
 $f(x) = \begin{cases} 3 & \text{if } 0 < x < 3 \\ x+3 & \text{if } x \leq 0 \end{cases}$

② $y = x+3$
 $\begin{array}{c|c} x & y \\ \hline 3 & 3 \\ 5 & 5 \end{array}$

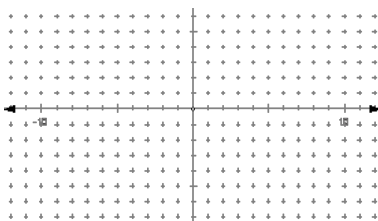
③ $y = 3$
 $\begin{array}{c|c} x & y \\ \hline 0 & 3 \\ 3 & 3 \end{array}$ open

Domain: \mathbb{R}

Range: \mathbb{R}



$$f(x) = \begin{cases} 1 & \text{if } x > 0 \\ 0 & \text{if } x = 0 \\ -1 & \text{if } x < 0 \end{cases}$$



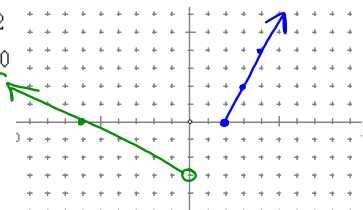
Domain:

Range:

$$f(x) = \begin{cases} 2x-4 & \text{if } x \geq 2 \\ -\frac{1}{2}x-3 & \text{if } x < 0 \end{cases}$$

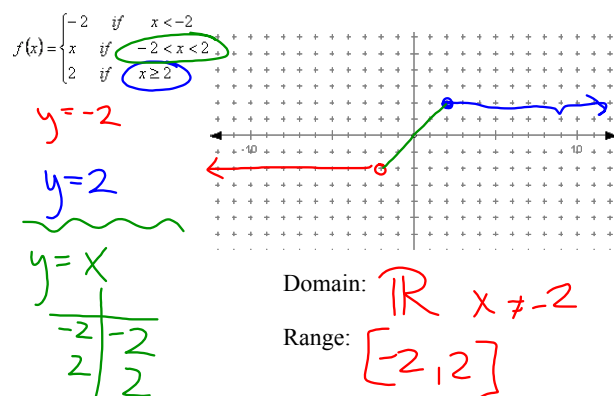
① $y = 2x - 4$
 $\begin{array}{c|c} x & y \\ \hline 2 & 0 \\ 5 & 6 \end{array}$

② $y = -\frac{1}{2}x - 3$
 $\begin{array}{c|c} x & y \\ \hline 0 & -3 \\ -6 & 0 \end{array}$ open



Domain:

Range:



HW

p.94

22, 23, 26-28, 38, 40, 42

